



WEST CREEK

preserve & greenway

NEWSLETTER OF THE WEST CREEK PRESERVATION COMMITTEE

in this Issue

PAGE 2

**Map of the West Creek
Watershed**

PAGES 3 AND 4

Household Septic Systems

PAGES 5 AND 6

**Why Should I Maintain My
Septic System**

PAGE 7

Septic vs. Sanitary

PAGE 8

Bacteria in Streams

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LOCATION, LOCATION, LOCATION

WHERE IS THE WEST CREEK VALLEY WATERSHED LOCATED

The West Creek Valley is located just south of the City of Cleveland in the south central section of Cuyahoga County.

West Creek travels nine miles through the communities of Parma, Seven Hills, Brooklyn Heights and Independence and serves as a tributary to the Cuyahoga River. The watershed of West Creek also includes small portions of the City of Cleveland and Broadview Heights.

The watershed encompasses 14 square miles of these communities between the vicinities of State Road to I-77 (east to west), and I-480 to just south of Pleasant Valley Road (north and south).

Land Use

The developed land coverage in the watershed includes single-family residential (55%), commercial (10%), and industrial (3%).

Transportation Facilities

With the construction of Interstates 77 and 480 in the 1970's and 1980's, the West Creek area has been highly impacted by the daily transportation activities of the region.

The current zoning within the watershed is primarily single-family residential, comprising of 69% of the total land area. These single-family residential zones consist mostly of lot sizes under one-half acre, with many areas allowing lots under 15,000 square feet in size. Multi-family zoning areas comprise about 2% of the land area within the watershed. The areas of land zoned commercial, totaling about 12% of the land within the watershed. The industrial zoning areas accounting for 6% of the total watershed land area.

The West Creek watershed has a population of about 39,700 residents. The City of Parma has approximately two-thirds of the residents residing within the watershed (26,700). Seven Hills has about 22% of the total residents (8,700), while Cleveland has about 7% of the total residents (2,700). Brooklyn Heights (2.5% - 1,000), Independence (1% - 400), and Broadview Heights (0.5% - 200). There are an estimated 27,000 households within the West Creek watershed.

Geology

The West Creek Valley consists of the Cuyahoga Group shales that were formed over 300 million years ago during the Mississippian Period of the Paleozoic geologic era. These layers include the Chagrin shale, Cleveland shale, Bedford shale, Berea sandstone, Orangeville shale, Sharpsville sandstone, Meadville shale, and glacial deposits.

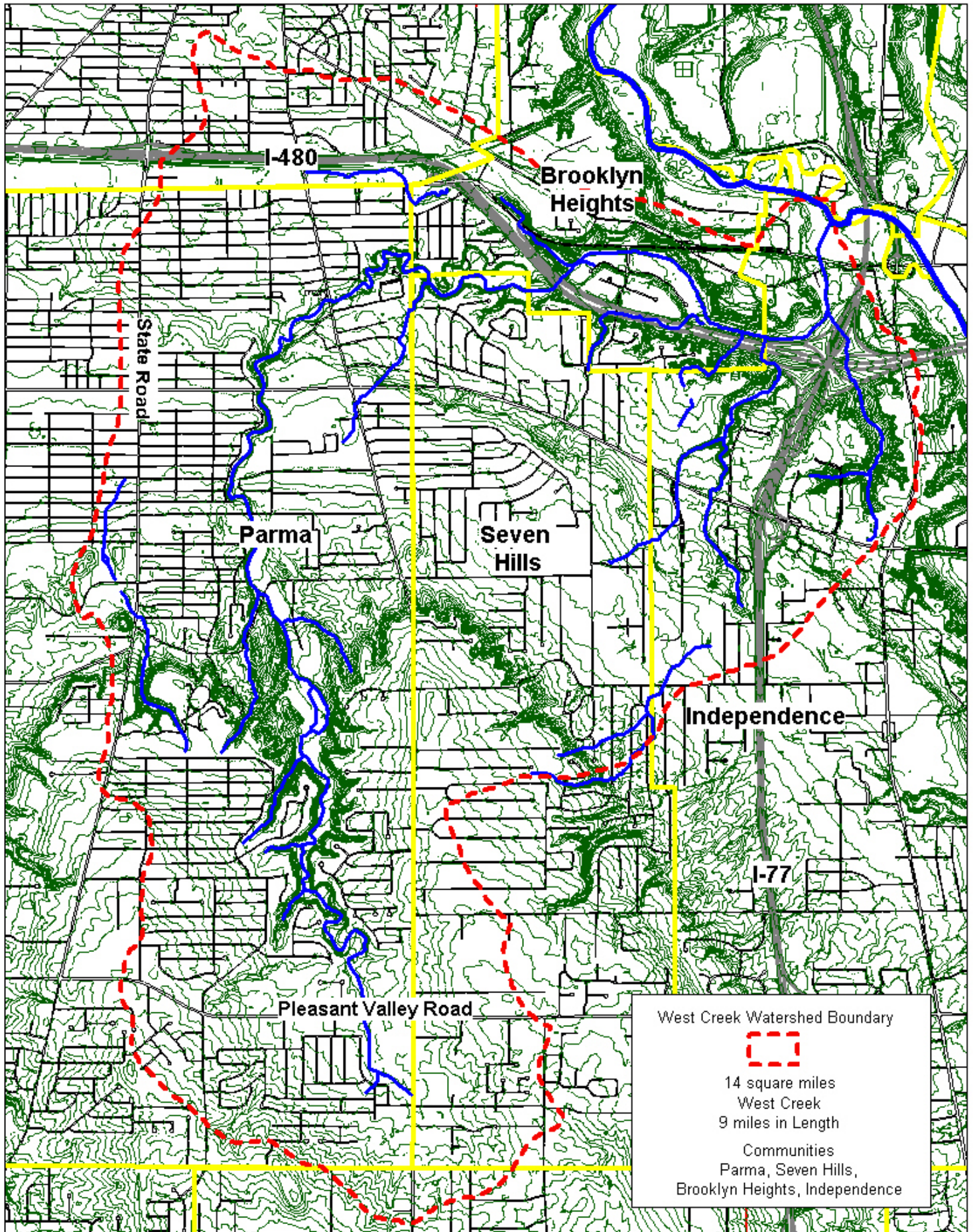
Soils

Based on USDA classifications, the West Creek watershed consists of primarily C and D Class soil groups with small areas of B Class soils within the watershed near the Cuyahoga River. Steep slopes generally have Dekalb Loudonville Complex in the upper reaches of the watershed, with much of the remaining downstream steep slope areas being Brecksville Silt Loam. The floodplain areas generally contain Chagrin Silt Loam in the upper reaches of the watershed, with Tioga Loam in the downstream areas.

Topography

The headwaters of the creek near Broadview Road south of Pleasant Valley Road are at an elevation of almost 1,100 feet above sea level. As the creek enters the Cuyahoga River north of Granger Road, the streambed has cut itself down to an elevation of 590 above sea level.

Map of the West Creek Watershed



YOUR SEPTIC SYSTEM IS YOUR RESPONSIBILITY

Did you know that as a homeowner you're responsible for maintaining your septic system? Did you know that maintaining your septic system protects your investment in your home? Did you know that you should periodically inspect your system and pump out your septic tank? If properly designed, constructed and maintained, your septic system can provide long-term, effective treatment of household wastewater. If your septic system isn't maintained, you might need to replace it, costing you thousands of dollars. A malfunctioning system can contaminate both groundwater that might be a source of drinking water as well as surface water. And if you sell your home, your septic system must be in good working order.

HOW DOES MY SEWAGE SYSTEM WORK?

Pipe from the home

All of your household wastewater flows through your plumbing and exits your home through a pipe to the septic tank. The contents of this sewer pipe should include the wastewater from all of the drains inside the home - sinks, toilets, showers, utility tubs, etc. Stormwater or groundwater that does not need to be treated by the septic system should not enter this pipe. Drainage from downspouts, sump pumps, etc. will send too much water to the system and possibly shorten its lifespan.

Septic tank

The septic tank performs the first step of the wastewater treatment process. The septic tank is a solid watertight tank designed specifically to accept all wastewater from the home. Some installations may have one tank or two tanks in series. All tanks should feature inlet and outlet baffles, along with an access manhole for cleaning.

The inlet baffle ensures that entering wastewater mixes with the liquid contents of the tank to begin bacterial breakdown of organic materials and separation of solids. The inlet baffle also prevents the floating scum layer from floating back and clogging the inlet pipe.

The outlet baffle ensures that only liquid is able to leave the tank and enter the secondary treatment portion of your system. If the scum layer reaches the outlet pipe, the pipe would quickly become plugged.

The contents of the septic tank stratifies into three layers:

- Floating Scum Layer - soaps, greases, toilet paper, etc.
- Liquid layer - water, liquid, and suspended solids
- Sludge - heavy organic and inorganic materials settle to the bottom of the tank.

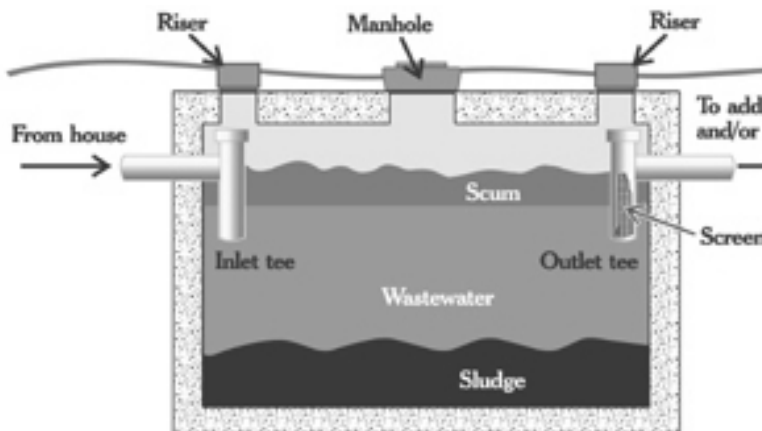
Bacteria that naturally occur in the sewage which enters the tank are necessary to break down organic materials in wastewater. This is often referred to as primary treatment. Pathogens in the waste are not destroyed in the septic tank. The septic tank and its bacteria prepare the wastewater for treatment by the remainder of your system.

To prevent buildup, sludge and floating scum need to be removed through periodic pumping of the septic tank. County regulations require that septic tanks be pumped out at least once every three years. If your family consists of four or more people, then you probably need to have it pumped more often.

The access lid for your septic tank is required to be kept to grade. This allows the tank to be easily located, pumped, and inspected. If your tank is not to grade, an extension riser can be installed at the time of your next cleaning.

The majority of sewage systems in the West Creek Watershed consist of an aeration system, or filter bed. These components of the overall system follow the septic tank. This is where the actual treatment of the wastewater occurs and is then discharged back into the environment. There are a few leachfields in this area. These systems are "on-lot", where the wastewater is able to percolate into the soil. These are only located in areas with suitable soils.

The West Creek watershed contains 837 household sewage treatment systems (HSTS). These systems, which consists of septic tanks, aeration systems, leaching fields, filter beds, were installed many years ago prior to the established municipal infrastructure system of sanitary sewer piping. The majority of these systems are directly impacting the water quality of the West Creek Watershed. In Cuyahoga County, and much of Ohio, the soils are too severe for proper percolation of the wastewater into the ground. The soils will not accept these volumes of water and can not provide the necessary treatment. For this reason, the majority of systems in this area are "off-lot" sewage treatment systems. These systems are designed to discharge the treated effluent from the septic systems back into the environment via a creek, storm or ditch.



cross sectional view of a septic tank

SYSTEMS

Aeration Systems

If you utilize a home aeration system, special care is required. The motor, which provides aeration to the system, must operate continuously. If it does not, the oxygen required by the microorganisms that thrive in the aeration system will not be sufficient and they will begin to die. These “sewage bugs” help to break down the organic matter in the wastewater and biologically convert it to stable substances in the form of gases and liquids. The aeration and mixing of the wastewater ensures that it comes in contact with the microorganisms so thorough treatment can occur.

Several aeration system designs also incorporate the use of filters to provide additional treatment. These filters need to be checked and cleaned on a routine basis to work effectively. If these filters become clogged, then the wastewater has no place to travel within that system. This can cause a possible backup. It can also cause solids to clog the motor, shortening its life span. Untreated waste may eventually leave the system and enter the environment.

Aeration systems have mechanical components, which will also need to be serviced and eventually replaced. Since much of the additional care and maintenance required with these systems is beyond the expertise of the average homeowner, various companies have been certified by the original manufacturers to offer extended service contracts.

Filter Beds

Although their design may have changed over the years, filter bed systems have been installed in Cuyahoga County for decades. Filter beds installed prior to the early 1970’s typically utilized gravel as a filtration media. These older beds consisted of clay tile pipes laid on top of a 15 to 24 inch thick bed of large gravel. A clay tile line was also placed below the gravel bed to act as a collection pipe. Wastewater from the septic tank would drain into the top pipes, filter through the gravel and be collected in the bottom line. This effluent was then discharged to the environment. Many of these systems are still in use today.

Unfortunately, these old gravel beds did not function well and did not have the ability to properly filter the sewage prior to discharging it to a ditch, stream or storm sewer. For this reason, approved filter sand has been utilized as the actual filtration media in more modern filter bed systems. Perforated pipe is laid in gravel both above and below the filter sand. The sand has a filtration capability that is far superior to that of gravel.

Filter bed systems installed in the last few decades typically use a splitter box, also known as a distribution box. This box contains a flow diversion device that directs the flow of wastewater to one side of the filter bed or the other. This allows one part of the bed to rest, while the other is in use. This may help extend the life span of your filter bed system. The flow diverter should be switched to alternate flow at least annually. For this reason, the flow diversion box must be kept to grade. If you do not know where it is located, contact your septic pumper, installer, or the Board of Health.

Leachfields

The typical sewage system installed throughout the country for decades has utilized a septic tank and a leaching tile field. By design, the sewage flows out of the tank and into either a clay tile or perforated pipe that is laid in trenches. The wastewater then drains from the pipes and enters the soil where it must be filtered and absorbed. This effluent must be properly filtered so that it does not pose a threat to ground water.

Leaching tile fields work well in areas with well drained, sandy soils. Unfortunately, much of Cuyahoga County consists of relatively poorly drained clay soils. These soils are often compacted and have little absorption capacity. The soil permeability - the rate at which water percolates into the soil - is very slow. Poorly drained soils are typically saturated with water during wet weather and stay wet for long periods of time after a heavy rain.

Leaching tile fields are designed to keep all of the effluent on lot. If your system utilizes a leachfield and is instead discharging off lot, your system is not operating properly. Leachfields will fail once the soil can no longer absorb the water that is being sent there from the septic tank. Once this occurs, the wastewater will either pond on top of the ground or find an alternative path and be discharged onto the ground at another location.

WHY SHOULD I MAINTAIN MY SEPTIC SYSTEM?

A key reason to maintain your septic system is to save money! Failing septic systems are expensive to repair or replace, and poor maintenance is often the culprit. Your system will need pumping (generally every 3 to 5 years), depending on how many people live in the house and the size of the system. A non-functioning septic system can lower your property value and could pose a legal liability.

Protecting health and the environment

Other reasons for safe treatment of sewage include preventing the spread of infection and disease and protecting water resources. Typical pollutants in household wastewater include nitrogen, phosphorus, and disease-causing bacteria and viruses. If a septic system is working properly, it will effectively remove most of these pollutants.

With one-fourth of U.S. homes currently using septic systems, more than 4 billion gallons of wastewater per day is dispersed below the ground surface or into the surface waters. Over a million septic systems are currently in use in the state of Ohio. Inadequately treated sewage from septic systems can be a cause of groundwater and surface water contamination. It poses a significant threat to drinking water and human health because it can contaminate drinking water wells and cause diseases and infections in people and animals. Improperly treated sewage that contaminates nearby surface waters also increases the chance of swimmers contracting a variety of infectious diseases. These range from eye and ear infections to acute gastrointestinal illnesses and hepatitis.

Inspect and pump frequently

You should have your septic system pumped once every three years. If you have an aeration system,

you should consider obtaining a service contract from the distributor of that particular system. This maintenance contract allows for routine inspections of all mechanical components of your system. For newer filter bed systems, the beds should be alternated on an annual basis at the distribution box. This allows for the alternating of the beds and will provide optimal life expectancy for your filter bed system. If you do not know where this box is located, contact the Board of Health for assistance.

Use water efficiently

Average indoor water use in the typical single-family home is almost 70 gallons per person per day. Leaky sinks and toilets can waste as much as 200 gallons each day. The more water a household conserves, the less water enters the septic system. Efficient water use can improve the operation of the septic system and reduce the risk of failure.

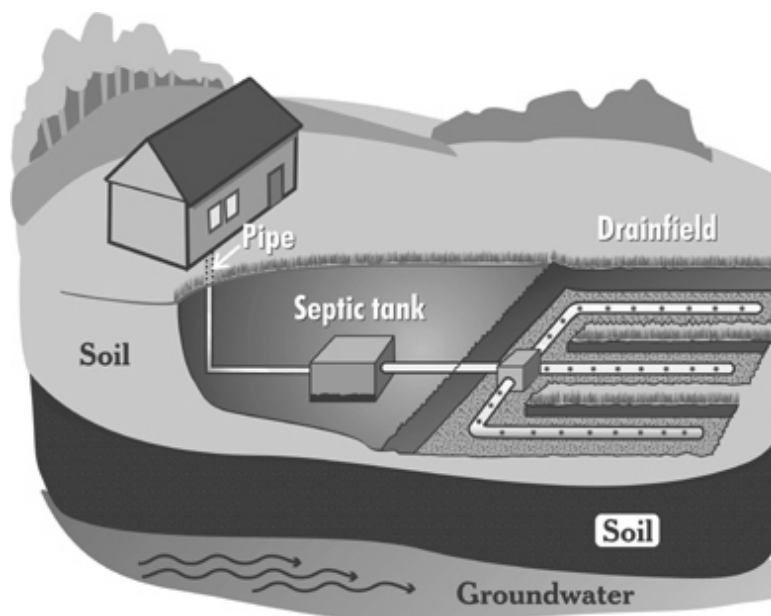
When septic systems are properly designed, constructed, and maintained, they effectively reduce or eliminate most human health or environmental threats posed by pollutants in household wastewater. However, they require regular maintenance or they can fail. Septic systems need to be monitored to ensure that they work properly throughout their service lives.

TOP THREE THINGS YOU CAN DO TO PROTECT YOUR SEPTIC SYSTEM

Do not build anything over or within ten feet of any part of your sewage system.

Do not allow anyone to drive heavy vehicles like cars or trucks over any portion of the system. Pipes and tanks may be damaged or crushed. The soil in the filtration or leaching field may be compacted, which would minimize its ability to filter and absorb sewage.

Do not plant any shallow rooted trees or shrubs, like willows or soft maples, near any portion of the system. Their roots will grow and travel laterally underground. As they seek water, they can grow into pipes causing blockages.



structure and function of a leach field

TAKE NOTE . . .

FOLLOW THESE EASY STEPS TO MAXIMIZE YOUR SYSTEM

High-efficiency toilets and showerheads

Toilet use accounts for 25 to 30 percent of household water use. Do you know how many gallons of water your toilet uses to empty the bowl? Most older homes have toilets with 3.5 to 5-gallon reservoirs, while newer high-efficiency toilets use 1.6 gallons of water or less per flush. If you have problems with your septic system being flooded with household water, consider reducing the volume of water in the toilet tank if you don't have a high-efficiency model. The use of high-efficiency showerheads can also dramatically minimize the volume of water the septic system receives on a daily basis.

Even though sewage systems thrive on wastewater, certain chemicals can harm the delicate balance in a septic tank and should not be run through the system. They include:

- Paints, thinners, and solvents
- Drain cleaners
- Motor oil, kerosene and gasoline
- Floor wax and Chlorine bleach

Other materials may not chemically harm the system, but may cause a blockage or clog pipes. These items will not break down and can not be digested by microorganisms. The following materials should never be flushed down the toilet or run down the drain:

- Grease, cooking oil and animal fat
- Cotton balls and cotton swabs
- Sanitary napkins and tampons
- Condoms
- Plastics
- Coffee grounds

Garbage disposals

Eliminating the use of a garbage disposal can reduce the amount of grease and solids entering the septic tank and possibly clogging components of your sewage system. A garbage disposal grinds up kitchen scraps, suspends them in water, and sends the mixture to the septic tank. Once in the septic tank, some of the materials are broken down by bacterial action, but most of the grindings flow through the tank and into the secondary treatment component of your septic system. This can cause filter beds and filters in aeration units to clog.



PRODUCTS NOT TO BE PUT INTO YOUR SEWAGE SYSTEM

USE WATER EFFICIENTLY

- Install high-efficiency toilets and showerheads
- Fill the bathtub with only as much water as you need
- Turn off faucets while shaving or brushing your teeth
- Run the dishwasher and clothes washer only when they're full
- Use toilets to flush sanitary waste only (not kitty litter, diapers, or other trash)
- Make sure all faucets are completely turned off when not in use
- Maintain your plumbing to eliminate leaks
- Install aerators in the faucets in your kitchen and bathroom

SEPTIC VS. SANITARY SEWER

INSIGHT INTO THE DIFFERENCE

What are Sanitary Sewers?

Sanitary sewers are a series of pipes, manholes, lift stations and other facilities that carry sewage from residences, businesses, and public institutions to a treatment plant where the sewage can be cleaned before it is discharged back into the environment.

Sanitary sewers are not installed to carry storm drainage, the runoff that occurs after rain or snow. In fact they are designed specifically to keep storm drainage out of the system.

What is the Difference Between Sewer & Septic Systems?

A sanitary sewer system collects sewage from a large area and carries the waste to a central location for treatment and discharge. Sanitary sewer systems can be as small as a single subdivision or regional systems that treat wastewater from many square miles of area.

Stormwater

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer systems or directly to a lake, stream, river, or wetland. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing and providing drinking water.

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment can also destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and aquatic organisms cannot exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards.

Septic systems are systems that dispose of household wastewater into the ground, or back into the environment, through a system located on the same property where it is generated.

Why are sewers installed?

Sanitary sewers are installed to provide wastewater disposal. The problem in this area is that many of the household sewage treatment systems are in failure and are not properly treating the wastewater prior to discharge back into the watershed. This then causes water quality impacts. By installing a sanitary sewer and eliminating these failing HSTS, the water quality of the entire watershed will be improved.

- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Debris (plastic bags, bottles and cigarette butts) washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.

"Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people."



WHY IS IT IMPORTANT?

Fecal coliform bacteria are microscopic organisms that live in the intestines of warm-blooded animals. They also live in the waste material, or feces, excreted from the intestinal tract. When fecal coliform bacteria are present in high numbers in a water sample, it means that the water has received fecal matter from one source or another. Although not necessarily agents of disease, fecal coliform bacteria may indicate the presence of disease-carrying organisms, which live in the same environment as the fecal coliform bacteria.

FECAL COLIFORM BACTERIA IN STREAMS

Expected Impact of Pollution

The primary sources of fecal coliform bacteria in this watershed are from malfunctioning HSTS. Fecal coliform concentrations are reported in units of the number of bacterial colonies per 100 mL of sample water (#/100 mL). The Cuyahoga County Board of Health performed a water quality analysis of West Creek in regards to these septic systems and their impact on the creek. Of the twenty sites tested in this study, fifteen of the sites reported samples with counts of fecal coliform that exceeded Ohio EPA standards (1,000 geometric mean fecal coliform content per 100ml).

Biocriteria Assessment

The Ohio EPA has designated large rivers and streams with specific aquatic life habitat uses. West Creek has use designations of Warmwater Habitat, Agricultural Water Supply, Industrial Water Supply, and Primary Contact Recreation.

The Invertebrate Community Index (ICI) measures water quality health based on assemblages of benthic invertebrates, such as aquatic insects and crustaceans. The ICI results from these groups indicate a "stressed ecosystem", scoring below the EPA established minimum standard. The Index of Biotic Integrity (IBI) is a quantitative measure of the health of fish communities. The IBI results also show indication of a stressed fish community. However, two study reaches yielded IBI scores in attainment of Warmwater criteria. The Qualitative Habitat Evaluation Index (QHEI) is a precise measure of the amount and quality of habitat available for fish and related aquatic habitat.

The QHEI results from the Davey Resource Group and Ohio EPA show West Creek scoring values between 48.5 and 76. The EPA minimum of value of 60 is generally considered capable of supporting communities of fish.

PAGE 8

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